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52-60

99. (New) A method according to any one of claims 81-89

wherein said metal is selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

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cont'd

100. (New) A method according to any one of claims 81, 83-85 and 87-89 further comprising a step of removing said portion after heating said crystallized semiconductor film.

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101. (New) A method according to any one of claims 82 and 86 further comprising a step of removing said gettering layer after the gettering.

102. (New) A method according to any one of claims 81, 83-85 and 87-89 wherein said phosphorus is introduced using an acceleration voltage.

REMARKS

Claims 26-80 are pending and at issue. Claims 26-31, 34-38, 41-46, 50-56, 59-63, 66-71, and 75-76 have been amended.

Claims 77 and 80 have been cancelled without prejudice. Claims 81-102 have been added. No new matter has been added.

Reconsideration and allowance of the above referenced application are respectfully requested.

Claims 26-80 stand rejected under 35 U.S.C § 112, first paragraph. Claims 26-31, 34-38, 41-46, 50-56, 59-63, 66-71, and 75-76 have been amended to conform the claims to the requirement. However, Applicant respectfully traverses two rejections under this section.

The Office Action states that "an insulating surface" in claims 26, 34, 42, 51, 59, and 67 is not supported by the specification. However, the present specification discloses silicon oxide film as a base film, which often acts as an insulating film or surface.

It also states that "not lower than 500 °C" and "not higher than 800 °C" in claims 26, 31, 51, and 56 are not supported by the specification. However, the specification discloses the temperature "500°C to 800°C" on page 22, line 19.

Claims 26-80 stand rejected under 35 U.S.C § 112, second paragraph. Claims 26-31, 34-38, 41-46, 50-56, 59-63, 66-71, and 75-76 have been amended to obviated the rejection.

Claims 76, 78-80 stand rejected under 35 U.S.C § 102(e) as being anticipated by Yamazaki et al. (U.S. Patent 5,789,284). An English translation of the priority document will be submitted to obviate this rejection.

Claims 76, 78-80 stand rejected under 35 U.S.C § 102(e) as being anticipated by Zhang et al. (U.S. Patent 5,529,937). This rejection is respectfully traversed.

The claims disclose forming a gettering layer on a crystallized semiconductor film. However, Zhang only teaches a gettering process using thermal oxidation.

Claims 76-80 stand rejected under 35 U.S.C § 102(b) as being anticipated by Japanese Patent No. 6-333824. This rejection is respectfully traversed.

'824 patent discloses providing phosphorus in amorphous silicon film before crystallizing the silicon film. The present claims are different from '824 patent in that they disclose providing phosphorus ion after the crystallization step.

Claims 76-80 stand rejected under 35 U.S.C § 102(b) as being anticipated by Japanese Patent No. 5-109737. This rejection is respectfully traversed.

'737 patent teaches providing phosphorus in amorphous silicon film before crystallizing the silicon film. The present claims are different from '737 patent in that they disclose providing phosphorus ion after the crystallization step.

Claims 51-53, 56-61, 64-69, 72-76, and 78-80 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Yamazaki et

al. (U.S. Patent 5,789,284). An English translation of the priority document will be submitted to obviate this rejection.

Claims 51-53, 56-61, 64-69, 72-76, and 78-80 stand rejected under 35 U.S.C § 103(a) as being anticipated by Zhang et al. (U.S. Patent 5,529,937). This rejection is respectfully traversed.

The claims disclose forming a gettering layer on a crystallized semiconductor film. However, Zhang only teaches a gettering process using thermal oxidation and fails to teach or suggest using phosphorus to getter the metal element from the crystalline film. It is more advantageous to use phosphorus to remove the metal element in the crystalline film than using thermal oxidization. Further, using phosphorus results in better quality junctions.

Claims 26-80 stand rejected under the doctrine of double patenting as being unpatentable over claims 1-31 of U.S. Patent 5,700,333. A terminal disclaimer will be filed with respect to '333 patent to obviate this rejection.

Claims 51-53, 56-61, 64-69, 72-76, and 78-80 stand rejected under the doctrine of double patenting as being unpatentable over claims 1-64 of U.S. Patent 5,789,284. This rejection is respectfully traversed.

'284 patent teaches forming an amorphous silicon film for removing metal element from the crystallized semiconductor film. However, the above-mentioned claims are not related to the use of amorphous silicon film as a gettering layer.

Claims 51-53, 56-61, 64-69, 72-76, and 78-80 stand rejected under the doctrine of double patenting as being unpatentable over claims 1-56 of U.S. Patent 5,529,937. This rejection is respectfully traversed.

As discussed above, the claims disclose forming a gettering layer on a crystallized semiconductor film. However, '937 patent only teaches a gettering process using thermal oxidation and fails to teach or suggest using phosphorus to getter the metal element from the crystalline film. It is more advantageous to use phosphorus to remove the metal element in the crystalline film than using thermal oxidization. Further, using phosphorus results in better quality junctions.

Claims 80-102 have been added. The newly added claims disclose introducing phosphorus by plasma doping instead of forming a getter layer. This is disclosed under fourth embodiment in the specification.

In view of the above amendments and remarks, all of the pending claims, as well as newly presented claims, should be in

condition for allowance. A formal notice to that effect is respectfully solicited.

Filed herewith is a check in payment of the excess claims fees required by the above amendments and Petition for Automatic Extension with the required fee. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 10/81/99

  
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